

Left Handed Electromagnetism at Terahertz Frequencies

D. Lippens

Institut d'Electronique, de Microélectronique et de Nanotechnologies
Université de Lille 1, avenue Poincaré, BP 69
59652 Villeneuve d'Ascq Cedex, France

We report on the possibility to experimentally demonstrate the left-handed character of metamaterial-based microstructures aimed at operating at Terahertz frequencies. To this aim, left handed transmission lines periodically loaded by shunt inductances and series capacitances along with SRR's and wire arrays on a short scale have been fabricated and characterized in the frequency and time domains. For the latter, with the prospect to reach 1 THz, electro-optic sampling techniques have been specifically developed for vectorial measurements using Franz-Keldysh detection scheme and Low temperature AlGaAs technologies. Direct evidence of lefthandedness is carried out via phase offset analysis compared to band structure calculations. Potential applications in the far infra red region are briefly reviewed.